

To what extent was the outcome of the Gulf War (1991) determined by technological developments?

The 20th century saw the greatest changes in warfare in history, because of the century's technological revolution. The role of technology in warfare was seen most evidently during the Gulf War in 1991, which pitted the UN Coalition forces against the belligerent Iraq led by Saddam Hussein. This essay will argue that the quality of military technology within the coalition forces, especially in its air power, made a fundamental difference in the outcome of the war. However, the role of other factors such as superior military leadership should not be overlooked.

Firstly, superior technology in air power arguably played the most decisive role in Coalition victory. One of the new technologies featured in aerial warfare in the Gulf War was Precision-guided munitions (PGMs), which were guided missiles intended to precisely hit a specific target, and minimise collateral damage. In total, the Americans delivered 9300 PGMs, aided through the use of stealth aircraft like the F-117A stealth bombers. The Coalition forces were able to take out the Iraqi air-defence system on the first night of operations, with devastating effects on the Iraqi ability to retaliate. Strategic bombing also contributed to the breakdown of the Iraqi command structure through the targeting of command and communications facilities, making it difficult for Saddam to coordinate his forces and mount an effective defence. 88% of Iraqi electrical grids were destroyed through smart bombing, resulting in an 80% fall in power generation nationally and incapacitating 90% of its oil refining ability. This effectively crippled Iraqi supplies and was a decisive factor in its defeat.

In addition, superior technology in air power enabled the Coalition to maintain aerial superiority right from the start of the war. Advanced airborne early warning and control aircraft like the E-3 Sentry was among the first to deploy, immediately establishing an around-the-clock radar screen to detect Iraqi forces and direct Coalition aircraft to intercept them. JSTARS aircraft coordinated land attacks from the air, giving Coalition forces an extensive communication network, allowing them to outmanoeuvre enemy forces and conduct pinpoint strikes on Iraqi targets. Spy satellites and unmanned aerial vehicles like the RQ-2 Pioneer provided real-time intelligence, serving to further shift the military advantage to the Coalition forces.

By contrast, the Iraqi lack of corresponding technology was a serious problem, for example they were unable to detect the massive movement of Coalition forces in the Hail Mary strategy and thus were unprepared for the Coalition assault. Within four days of the start of the war, Coalition forces were able to achieve total air dominance, having driven the Iraqi Air Force into hiding and effectively destroyed its integrated air defence system. Thus, this extremely successful use of air power in defeating the technologically inferior Iraqi forces had led John Stoessinger to comment that the Gulf War was "probably the only case in military history of a victory achieved almost by air power alone."

Another factor that contributed to the outcome of the Gulf War was technological developments in naval power, however it was not as significant as air power. Apart from air power, establishing control over the sea was central to Coalition success where its overwhelming naval dominance allowed it to operate freely in the Persian Gulf, greatly augmenting its air-land campaign. The US Navy quickly achieved naval superiority through the deployment of 6 aircraft carriers in addition to other Coalition warships, which easily overwhelmed the tiny Iraqi navy consisting only of small missile-armed patrol boats. This was crucial to the enforcement of the Coalition naval blockade, which cut Iraq off through a tight embargo. In total, Iraq's GNP was reduced by half, denying it the materiel necessary to sustain and replenish its war machine.

Naval dominance also allowed Coalition forces to conduct offshore gunfire against Iraqi land targets from a considerable distance. Most notably, warships launched sophisticated Tomahawk cruise missiles, which had much greater range compared to ordinary gun shells. These missiles were directed against high-priority installations considered too heavily defended for conventional air missions, such as fortified command and control centres, fixed Scud sites, and nuclear and chemical weapons plants. This thus enabled the Coalition to score vital successes against Iraqi targets that air power would have had difficulty achieving. However, naval strategic bombing did have its limitations. For instance, Tomahawk hit percentage was an issue. As the terrain features that guided the Tomahawks were destroyed in the war, the missiles' complex navigation systems could not locate their targets, hence having a total hit accuracy of only 85%. Thus, superior technology in naval power did not play as vital a role as air power in the overall success of Operation Desert Storm, mainly serving to supplement the air campaign.

On the ground, technological developments moved the focus away from infantry and artillery towards armoured and mechanised warfare. However, was not a major factor that led to the victory of the Coalition forces. Following the incapacitation of the Iraqi military and the country's infrastructure during the air campaign, the land attack eventually came on 24 February and quickly succeeded in encircling and driving the Iraqi army from Kuwait. Coalition tanks like the American M1 Abrams, M2 Bradley and the British Challenger were a generation ahead of anything the Iraqis possessed. The most significant advantage is that they could move and fire at the same time, a feature unknown to the obsolescent Soviet-era Iraqi tanks. Often in battle, Iraqi tanks would mistakenly fire at the muzzle flash of Coalition tanks without realising they were no longer in that position. The Coalition tanks also had the ability to fire farther with a greater accuracy and with more punch using depleted uranium shells. Furthermore, the development of night-vision technology allowed the continuation of warfare at night, while ground forces had Global Positioning System (GPS) technology to navigate their way in the desert. The superiority of the Coalition forces was evident through the loss of 2000 to 3000 Iraqi tanks, while not a single American tank was destroyed. However, the land warfare had limited significance when compared to air power as the bombings had already dealt grievous damage to Iraqi materiel and morale, who emerged from their foxholes by the tens of thousands to surrender. Hence, superior technology on the ground only served to expedite the final defeat of Iraqi forces and was not as crucial to victory as air power.

There is no doubt that technological developments in aerial, naval and ground warfare made Coalition victory more decisive. However, to claim that superior technology won the war for the Coalition entirely would be somewhat exaggerated. Apart from technological developments, the superior leadership and organisation of the Coalition compared to the Iraqis was crucial in determining the outcome of the war. The Coalition benefited from the outstanding leadership of General Norman Schwarzkopf, who was able to effectively coordinate Coalition forces and "keep the potentially divisive coalition marching in cadence" according to Jean E. Smith. For example, he was responsible for convincing Israel from getting involved in the war when it was **bombarded by Saddam's** Scud missiles, nearly splitting the Coalition. Furthermore, having learnt much from the mistakes of the Vietnam War, Schwarzkopf and General Colin Powell recognised the importance of a unified command structure and ensured proper delegation of authority within Coalition forces during the Gulf War. The Coalition was thus able to maintain much greater unity within their faction, which no doubt gave them an advantage on the battlefield. By contrast, coordination within the Iraqi army between the Corps, Republican Guards and regular army remained weak. The Iraqi leadership was characterised by authoritarianism and over-centralisation of power in the hands of Saddam, who often micro-managed Iraqi military operations during the war. This made Iraq more susceptible to tactical blunders, such as Saddam's decision to hold hostages and conduct eco-terrorism in the Gulf,

which only served to alienate world opinion against him. This further legitimised the Coalition, denying Iraq of the support of potential allies that might have been valuable to the war effort in terms of military and economic power. Thus, the inferior military leadership of Iraq severely hindered its chance of success during the war.

According to Jean E. Smith, “seldom, if ever, had a victory been so one-sided, or a defeat so massive.” It is clear that technological developments, particularly in aerial warfare, was the factor that decided the outcome and victory of the Gulf War, as the Iraqi forces simply could not compete with the sophisticated and advanced technology of the Coalition forces. However, other factors such as the Coalition’s superior military leadership were also crucial in giving them a decisive advantage, and were no doubt significant in their eventual victory.